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ABSTRACT

A questionnaire study conducted with 774 children, aged 8 to 17 confirmed predictions that age is directly related to (a) the degree of probabilism, or uncertainty, within children's expectancies of encountering a variety of health problems, and (b) the level of perceived vulnerability to health problems. Data were obtained in 28 classes, 4 at each of 7 grade levels (3rd through 9th) within the schools of a large city. Equal numbers of classes were drawn from innercity and non-innercity areas. Findings reflecting significant SES effects were explained in terms of differential normative pressures and communications processes. (Author)

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THE DEVELOPMENT OF HEALTH BELIEFS[1]

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Although psychologists have historically been concerned with mental and psychosomatic disorders, an unexplored gap exists between traditional areas of psychological research and the broad spectrum of health behavior. The wide applicability of the systemic model (e.g., Miller, 1955; Rokeach, 1960; Harvey, Hunt & Schroder, 1961; Gochman, 1966, 1968) suggests its appropriateness as a conceptual device for bridging this gap.

Differentiation, the number of parts of which some system is composed, is a major dimension within systemic models. In conceptual systems, differentiation refers to the degree to which beliefs and expectancies are comprised of alternative facets. Differentiation is both a developmental process as well as an outcome of such processes. The very young child, whose concepts are poorly differentiated, construes and perceives in an all-or-none, absolutistic fashion. The older child, whose concepts have progressed through greater differentiation, exhibits greater probabilism, or uncertainty, in his beliefs and expectancies. To the extent that health beliefs reflect general psychological principles, they should exhibit the same progression. Perceived vulnerability, the degree to which a person expects to encounter health problems, comprises a set of beliefs in which such a progression can be explored.

PS005193

Older children should show greater degrees of probabilism, or uncertainty, than younger children in their expectancies of encountering health problems. Hypothesis 1 thus states that chronological age is directly related to probabilism within health problem expectancies.

Moreover, the relative stability of adult health behaviors such as smoking, in the face of pressures to modify them (e.g., Matarazzo & Matarazzo, 1968), and the difficulty encountered in significantly altering selected health beliefs (e.g., Haefner & Kirscht, 1970) suggest the importance of studying a wide range of health-relevant behaviors as they emerge developmentally in the child. Such investigations could point to periods when health behaviors are more amenable to modification through educational programs and communications.

Perceived vulnerability, the degree to which a person expects to encounter health problems, is held to be a critical determinant of engaging in some beneficial or preventive health behavior (e.g., Rosenstock, 1966). The chronological development of perceived vulnerability thus becomes one focal point of this study. From accrued evidence on fears of remote dangers (e.g., Hurlock, 1959, p. 179-180) it is reasonable to suggest that such perceptions are heightened as the child grows older. Hypothesis 2 thus states that chronological age is directly related to perceived vulnerability. Cross-cutting these hypotheses are concerns about the effects of sex differences and socio-economic status.

Method

Subjects

A sample of 774 children was obtained through the school system of a large Great Lakes area city. At grade levels 3 through 6, one

class was obtained in each of four schools, two located in the inner-city and two in non-innercity areas. For grades 7 through 9, two classes at each level were obtained in an innercity junior high school and two were obtained in a non-innercity junior high. Within this sample, 429 were white and 321 were non-white (data were not available for 24); 402 lived in non-innercity areas and 372 lived in the innercity. Virtually half (397, 51.3%) were boys and half (377, 48.7%) were girls. The children ranged in age from 8 to 17. A total of 28 classes, four at each of seven grade levels was thus obtained.

Measures

Perceived vulnerability. Perceived vulnerability was assessed through responses to 15 specific expectancy questions, such as "What chance is there of your getting the flu during this next year?" The expectancies dealt with a bad accident, a rash, a fever, having a tooth pulled, a sore throat, flu , a toothache, a cold, bleeding gums, an upset stomach, missing a week of school because of sickness, a cavity, a bad headache, breaking or cracking a tooth, and cutting a finger accidentally. These health problem expectancy questions were interspersed with 8 others relating to other aspects of the children's lives; for example, "What chance is there of your playing with your friends during this next year?"

For each item, a youngster was instructed to select from among 7 alternatives the one response that best expressed his expectancy: no chance, almost no chance, a small chance, a medium chance, a good chance, almost certain, or certain. The items and response alternatives were selected so that they were appropriate for the entire

age range of the sample, and the instructions were designed so that even the youngest subjects understood the task and the continuum of responses. The responses were scored from 1 for the "no chance" alternative to a maximum of 7 for a response of "certain."

Probabilism. Although perceived vulnerability and probabilism are conceptually independent, probabilism scores were derived by converting the 7-point expectancy scale into a 4-point scale. Responses of "no chance" and "certain", each representing maximum absoluteness and minimum differentiation, were scored as 1; responses of "almost no chance" and "almost certain" were scored as 2; "a small chance" and "a good chance", as 3; and "a medium chance", reflecting maximum uncertainty and differentiation, as 4.

Socio-economic status. The study's limited resources precluded precise assessment of socio-economic status (SES) through the traditional measures of income, parental education, and occupation, etc. Instead, school location, i.e., innercity vs. non-innercity was used as a distinguishing measure of SES.

Procedure

The questionnaire was prepared on multi-colored paper to de-emphasize associations with testing and evaluation. It was administered during regularly scheduled class time as part of a larger research program. The potential subjects were assured of confidentiality and anonymity, and were permitted to decline to participate if they wished. In all classes, to insure standardization, each item was read aloud. The sessions generally lasted from about 35 minutes for the higher grades to nearly 55 minutes in the lower grades.

Results

Assessment procedures

Product-moment correlation coefficients were computed for each pair of health problem expectancy items and for each pair of their probabilism scores (statistical consultation confirmed the appropriateness of a decision to treat the data as interval scales). Among 105 pairs of expectancy items, the average correlation-coefficient, determined by the r to z transformation was .24, reflecting significant inter-item agreement ($p < .0005$). Among the 105 pairs of probabilism scores, the average coefficient was .26 ($p < .0005$).

These analyses reveal internal consistency within each measure, and indicate the appropriateness of using the mean of each set of 15 individual scores as a single measure of perceived vulnerability or probabilism. In this sample, the mean perceived vulnerability score was 4.10; the mean probabilism score was 2.47.

Tests of hypotheses

For each hypothesis a product-moment correlation coefficient was computed to determine the overall relationship, and a 3-way multiple analysis of variance using 4 age groups (8-9, 10-11, 12-13, 14 and older) was performed to assess the effects of sex, SES, and their interactions with age.

Hypothesis 1. A correlation coefficient of .19 obtained between age in months and probabilism scores revealed a significant relationship between them ($t=5.20$, $df=748$, $p < .0005$). The multiple analysis of variance showed significant main effects for age and SES as well as a significant interaction between them (See Table 1). Children

PS 005193

in the innercity have significantly lower probabilism scores than those in the non-innercity, 2.37 compared to 2.57.

Hypothesis 2. A correlation coefficient of .17 obtained between age in months and perceived vulnerability scores demonstrated a significant relationship between them ($t=4.74$, $df=748$, $p < .0005$). The multiple analysis of variance revealed significant main effects for each independent variable as well as significant interaction between age and SES (See Table 1). Girls have significantly higher levels of perceived vulnerability than do boys, 4.21 compared to 4.00; and innercity children have significantly lower levels of perceived vulnerability than non-innercity children, 3.94 compared to 4.25.

Table 1 about here

Discussion

Assessment procedures

As in previous research with different item formats and different response alternatives (Gochman, 1970, 1971a,b,c), measures of perceived vulnerability and of probabilism continue to show internal consistency. Observations already accrued are given further confirmation: a child who has a relatively high expectancy of encountering some one health problem has relatively high expectancies of encountering others. Conversely, a child who has a relatively low expectancy of encountering some one health problem has relatively low expectancies of encountering others. Such consistency within expectations continues to persist across different subject samples, different samples of health

problems and different question formats. In conjunction with observations that no consistent relationship exists between health history and perceived vulnerability (Gochman, 1971b), these data argue that perceived vulnerability to health problems may be a personality characteristic, perhaps related to general anxiety.

Similar consistency within probabilism scores indicates that the relative degree to which a child exhibits certainty (uncertainty) in his expectancies of some one health problem is related to the relative degree to which he exhibits it in others. Such consistency confirms prior findings (Gochman, 1971c) and corroborates the suggestion that differentiation is a general characteristic of perceptual systems (Gochman, 1966).

Perceived vulnerability

Chronological development and SES. The results confirm hypothesis 2. A direct relationship exists between chronological age and perceived vulnerability in the sample as a whole. However, the significant interaction of age and SES demands further examination of this relationship. Among innercity children perceived vulnerability scores increase consistently with age: 3.22, 3.89, 4.16, 4.17. Among non-innercity children, there is some increase up to age 14 followed by a slight decrease: 4.14, 4.20, 4.36, 4.28. It can also be noted that there is a much smaller range among these four means. One-way analyses of variance within each group reveals a significant relationship between age and perceived vulnerability for the innercity children ($F=13.49$, $df=3,349$, $p < .000001$), but no significant relationship for the non-innercity children ($F=1.37$, $df=3,393$, N.S.). Thus, the support found for hypothesis 2 is derived primarily from chronologically

related increases in perceived vulnerability among children in the innercity.

A two-stage explanation of the differential tenability of the hypothesis for innercity and non-innercity youngsters is derived from both D'Onofrio's synthesizing inference (1966, p. 135) that persons belonging to relatively low SES groups exhibit greater variability in health-relevant behaviors than do persons belonging to higher SES groups, and from Green's status identity model (1970) which asserts that persons in low socio-economic groups who increase their contact and communication with members of middle and high socio-economic groups are more likely to be influenced by the norms of these latter groups. With health related beliefs and behavior, this influence is unidirectional.

The inferred greater variability in health beliefs is, in fact, observed. Of the 15 different health problem expectancy questions, there were higher standard deviations on 14. This would indicate greater variability among innercity children. A simple sign test reveals such a split to be significant ($p < .001$). However, as innercity children grow up, and their contacts with the norms of the wider community become more numerous, their health relevant beliefs are increasingly influenced and determined by the norms of the larger community. The mean perceived vulnerability scores of the older innercity children come closer to those of the non-innercity. Within the non-innercity, children's beliefs about health and illness are apparently subject to normative pressure much earlier, and within the ages studied there is thus very little developmental change.

Furthermore, at each of the four age levels, innercity children had lower perceived vulnerability scores than those in the non-innercity (although the difference decreases with age), indicating that the main effect attributable to socio-economic status is consistent.

Socio-economic status. The significantly lower overall levels of perceived vulnerability in innercity children is a paradox to those who would expect a direct relationship to exist between illness experiences and perceived vulnerability. While no direct evidence is available about the history of general health problems in this sample, residents of communities similar to those of the innercity have notably limited access to medical and dental services and higher illness incidence rates (e.g., United States Department of Health, Education, and Welfare, 1970). Evidence also exists (Koos, 1954, ch. 2) that such communities tend to have lower expectancies of encountering health problems than do communities that have experienced less deprivation.

Quite possibly, social class and cultural factors enter into the child's appraisal of what sensory input or feelings will be labelled as illnesses. Social and cultural factors may thus determine threshold levels for interpreting experiences of illness. An unfortunate corollary, is the implication that those persons with greatest needs for preventive health behaviors may acquire beliefs that decrease the likelihood of taking such actions.

Sex. One concomittant of the socialization processes in contemporary American society which differentially reinforce dependency, is that girls are more likely than boys to be made aware of a variety

of potentially distressing environmental and experiential encounters. Such reinforcement patterns together with the greater ease with which girls admit to anxieties and concerns about bodily dangers, (e.g., Mussen, Conger, & Kagan, p. 463) are consistent with the observed sex differences in perceived vulnerability.

Data on children's health (United States Department of Health, Education, and Welfare, 1970, 1971) offers no consistent evidence that girls are in fact sicker than boys; if anything, boys seem to suffer more from a variety of health problems. There thus seems to be no direct experiential determinant of perceived vulnerability.

Probabilism

The results also confirm hypothesis 1. A direct relationship exists between chronological age and probabilism within health problem expectancies, for the sample as a whole. Again, a significant interaction between age and SES requires further examination. Among innercity children mean probabilism scores increase consistency with age: 2.10, 2.20, 2.50, 2.59; among non-innercity children the mean scores of 2.50, 2.47, 2.72, and 2.55 do not exhibit such consistent increases.

The D'Onofrio and Green assertions also provide explanations of the observed relationships between age, SES, and probabilism. Accordingly, the lower probabilism levels in innercity children reflect in part the observed greater variability of their health problem expectancies. For relatively moderate values of perceived vulnerability, such greater variability will be reflected mathematically in a lower probabilism score. As the children in the innercity grow older and the normative influences of the larger community increase,

the difference in probabilism levels disappear.

One-way analyses of variance reveal significant relationships between age and probabilism within each group ($F=11.06$, $df=3,349$, $p < .000001$, in the innercity; $F=4.82$, $df=3,393$, $p < .005$ in the non-innercity) but among non-innercity children such a relationship cannot be considered linear.

Possibly, the normative influences in the non-innercity operate at an age far younger than the range observed in this sample, and the predicted steps of conceptual development have occured before age 8. Moreover, according to the systemic model, a decrease in probabilism scores such as that observed between ages 12-13 and 14 and older may represent the emergence of conceptual interdependence (e.g., Gochman, 1968) which is often accompanied by a decrease in differentiation.

Implications

The results of this study have implications for psychological theory and the direction of psychological research, as well as for public health professionals.

The observation that probabilism increases with age, although not necessarily in linear fashion, confirms the systemic view of development: as children grow older they demonstrate greater degrees of differentiation in their belief systems. While most general behavior theories other than psychoanalysis are derived from data obtained from rather homogeneous, middle-class (often college-sophomore) samples, it is particularly worth noting that the greatest support for the hypotheses underlying this study came from the subjects in the innercity.

Because perceived vulnerability to health problems shows the

same developmental progressions attributed to other beliefs and concepts (e.g., Harvey, Hunt & Schroder, 1961; Rokeach, 1960) it can be considered to exhibit general psychological principles. To the extent that perceived vulnerability is representative of other health-relevant beliefs, the results obtained give evidence of the appropriateness of increased psychological study of the entire domain of health behavior.

Moreover, the overall tendency of the observed sample to perceive itself as neither vulnerable or invulnerable should be of interest to health educators and public health personnel who are concerned with altering health behaviors. Perhaps a major goal for such practitioners should be to increase perceived vulnerability. The difficulty in changing adults' health behavior may lie in the fact that they do not perceive themselves as sufficiently vulnerable to health problems to engage in beneficial health behaviors.

In addition, the greater variability in the health problem expectancies of younger children in the innercity, indicating the relative absense of normative pressure, suggests that health beliefs in such populations may be highly appropriate targets for change by communications and programs devised by health educators.

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TABLE 1

Three-Way Analyses of Variance for Perceived Vulnerability and Probabilism

Source	df	Perceived vulnerability MS	Perceived vulnerability F	Probabilism MS	Probabilism F
SES (A)	1	22.41	28.30***	7.79	23.01***
Sex (B)	1	6.99	8.83**	.04	
Age (C)	3	8.77	11.08***	4.15	12.27***
A x B	1	.58		.01	
A x C	3	4.63	5.85***	1.28	3.78*
B x C	3	2.01		.07	
A x B x C	3	.43		.14	
Error	734	.79		.34	

* p <.05

** p <.01

*** p <.001